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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,329	01/26/2004	Atsushi Kitaoka	00862.023415.	7516

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EXAMINER

KRAMSKAYA, MARINA

ART UNIT PAPER NUMBER

2858

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/763,329	KITAOKA, ATSUSHI	
	Examiner	Art Unit	
	Marina Kramskaya	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 8 is/are rejected.
- 7) ☒ Claim(s) 6 and 9 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/08/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "amplifier" must be shown or the feature(s) canceled from the claim(s). The elements labeled 111, 112, 55, 56, 57, 601-611, are referred to as "amplifiers"; however, only symbols of alternating current sources are shown. The symbol of a "source" is generally not accepted in the art to represent an "amplifier", which is disclosed and claimed. Further, "a source amplifier," as in claim 7, for supplying three probes must be shown. Currently the drawings show three separate amplifiers supplying three probes. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

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application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 3 is objected to because of the following informalities: it is identical in language and scope to claim 2. Claim 3 does not further limit the scope of claim 2. Appropriate correction is required.
3. Claims 6 & 9 are objected to because of the following informalities: claim 6 & 9 recite the limitation " the change of the relative position ". There is insufficient antecedent basis for this limitation in these claims. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Darius et al., US 4,769,594.

As per Claim 1, the examiner is interpreting the amplifier as a signal source producing a current in combination with an amplifier.

Darius discloses a measurement apparatus which measures a distance (column 1, lines 10-15) between a sensor probe 4 and a target 2 to be measured by using an electrostatic capacitance sensor, comprising:

- first and second sensor probes (plurality of probes 4) which are arranged at respective predetermined gaps (i.e. "defined distance", column 44, line 29) to the target 2; and
- first and second sensor amplifiers (plurality of 8, U_{G1} & U_{G2} in combination with amplifier 14) which are connected respectively to the first and second sensor probes (plurality of probes 4),
- wherein when a distance between the target and the first or second sensor probe is measured (column 1, lines 20-21), said first amplifier (8, U_{G1} in combination with amplifier 14) supplies a first current I_1 with the first sensor probe 4 and said second amplifier (8, U_{G2} in combination with amplifier 14) supplies a second current I_2 which is different phase and/or amplitude from the first current (different frequency: column 1, lines 56-60 and different amplitude U_{G1} and U_{G2} : column 5, lines 1-2).

As per Claims 2 & 3, Darius further discloses setting a change rate of the amplitude of the second current to 0, when the gap distance is measured by the first

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sensor probe only, in order to save energy, since no energy is required by the second probe when it is not in use for measurement. (This interpretation reads upon the claimed "when said gap is measured by the first sensor probe, a change rate of the amplitude of the second current is set to 0.")

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Darius et al., in view of Nakayama et al, US 6,538,457.

Darius discloses the capacitive distance measurement apparatus as applied to Claim 1, above.

Darius does not explicitly disclose setting the phases of the first and second current to be different by 180°.

Nakayama discloses a distance measurement apparatus, wherein the phases of the first and second currents are set to be different by 180° (see FIG. 4, column 1, lines 39-42).

Therefore, it would have been obvious to a person of ordinary skill in the art to set the phase difference between the first and second currents to 180°, as taught by

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Nakayama, in the measurement apparatus of Darius, in order to reduce noise by including a phase shift into the frequency shift of Darius.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Darius in view of Quate et al., US 5,319,977.

Darius discloses a measurement apparatus as applied to Claim 1, above. Darius further discloses a mechanism, which changes a relative position of a target **2** relative to the sensors (i.e. rotate the target, column 1, lines 25-26).

Darius does not disclose a mechanism, which changes a relative position of each sensor probe relative to the target and a controller which determines the phases and/or amplitudes of the first and second current based on each of the relative position.

Quate discloses a capacitive distance measurement apparatus comprising a mechanism **102** which changes a relative position of each sensor probe and target (column 4, lines 15-23) and a controller **114** which determines the phases or amplitudes of the first and second current (produced by **230**) based on each of the relative position.

Therefore, it would have been obvious to a person of ordinary skill in the art to include a mechanism to change relative position of the sensor probes and a controller for controlling the currents based on position, as taught by Quate, in the measurement apparatus of Darius, in order to scan the surface by the probes rather than moving the surface and produce the appropriate currents for distance measurement.

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9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Darius, in view of Susuki et al., US 5,920,198, and Cripe, US 6,188,283.

The examiner is interpreting the amplifier as a signal source producing a current in combination with an amplifier.

Darius discloses a measurement apparatus which measures a distance (column 1, lines 10-15) between a sensor probe **4** and a target **2** to be measured by using an electrostatic capacitance sensor, comprising:

- first, second and third sensor probes (plurality of probes **4**) which are arranged at respective predetermined gaps (i.e. "defined distance", column 4, line 29) to the target **2**; and
- sensor amplifiers (a plurality of **8**, U_{G1} , U_{G2} , & U_{G3} , in combination with amplifier **14**, as shown in detail in FIG. 3) which supply a current to the sensor probes **4** and outputs a measurement result (column 2, lines 61-63),
- wherein the first sensor amplifier (**8**, U_{G1} , in combination with **14**) supplies a first current I_1 to the first sensor probe (first of plurality of **4**), the second sensor amplifier (**8**, U_{G2} , in combination with **14**) supplies a second current I_2 to the second sensor probe (second of plurality of **4**) and the second sensor amplifier (**8**, U_{G3} , in combination with **14**) supplies a third current I_3 to the third sensor probe (third of plurality of **4**).

Darius does not explicitly disclose setting the phases of the first, second and third current to be different by 120° .

It is well known in the art to set the phases of the currents to be different by 360° divided by the number of sensing probes, as evidenced by Suzuki, where there are eight probes, and the phases are set to differ by 45° (FIG. 10(c)). Further, Cripe discloses four probes, and setting the phases to differ by 90° (FIG. 4). And, further Nakayama, as applied to claim 2 above, discloses two probes, wherein the phases are set to differ by 180° .

Therefore, it would have been obvious to a person of ordinary skill in the art to set the phases of the current to differ by 120° , in the apparatus of Darius, in order to reduce noise by including a phase shift into the frequency shift of Darius.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Darius, in view of Suzuki and Cripe as applied to claim 7 above, and further in view of Quate.

Darius discloses a measurement apparatus as applied to Claim 7, above. Darius further discloses a mechanism, which changes a relative position of a target 2 relative to the sensors (i.e. rotate the target, column 1, lines 25-26).

Darius does not disclose a mechanism, which changes a relative position of each sensor probe relative to the target and a controller which determines the phases and/or amplitudes of the first and second current based on each of the relative position.

Quate discloses a capacitive distance measurement apparatus comprising a mechanism 102 which changes a relative position of each sensor probe and target (column 4, lines 15-23) and a controller 114 which determines the phases or amplitudes of the first and second current (produced by 230) based on each of the relative position.

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Therefore, it would have been obvious to a person of ordinary skill in the art to include a mechanism to change relative position of the sensor probes and a controller for controlling the currents based on position, as taught by Quate, in the measurement apparatus of Darius, in order to scan the surface by the probes rather than moving the surface and produce the appropriate currents for distance measurement.

Allowable Subject Matter

11. Claims 6 & 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art fails to teach a capacitive distance measurement apparatus characterized in the sensor positioning, wherein said sensor probes are so arranged as to simultaneously position centers of said plurality of sensor probes at a target boundary upon the change of the relative position.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamaoka, US 6,825,673, Kesil et al., US 6,801,044, Mallory, US 6,714,023, Chiu et al., US 6,067,025, Sundin, US 6,329,812, disclose a capacitive distance measurement apparatus.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571)272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MK

Marina Kramskaya
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